

# Agile government: Systematic literature review and future research

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## A B S T R A C T

Governments need to adapt to changes in their internal and external environments and create systems that allow them to scan trends, identify developments, predict their potential impact on the organization, and quickly learn how to implement changes to their standard operating procedures. As a response, government organizations are adopting agile approaches as part of their process redesigns, project management, and software development approaches. Although agility and adaptiveness are long in use in the private sector, they have been increasingly adopted in the public sector literature and practices. In order to understand the existing theoretical and practical foundations of the field, we have conducted a systematic literature review and identified four streams of research areas: (1) software development approaches, (2) project management approaches, (3) application areas, and (4) potential outcomes. In this article, we synthesize this literature, provide an outlook on future research questions, and introduce several articles as part of the current special issue focused on agile government.

## 1. Introduction

Governments around the world have to respond faster to citizen needs, like the expectation of 24/7 availability and personalized access to government services generated by the so-called 'Facebook generation'. Seamless user-centric experiences on social networking suites, such as Weibo or Twitter, as well as online marketplaces such as Amazon, increase the demand for similar experiences with government services. In addition, industry trends that include Big Data, predictive analytics methods, and Smart City approaches drive the need for governments to create internal capacity and skill sets to evaluate, respond to, and implement new technologies and internal processes.

The previous new public management era has left many government organizations with a reduced skill set and limited capacity to upgrade their IT infrastructure (Dunleavy, Margetts, Bastow, & Tinkler, 2006). As a result, the capability of governments to innovate has been deteriorated due to increasing incentives to outsource, especially IT development and services. The [HealthCare.gov](#) rollout disaster in the U.S. was a clear indication that the role of information management experts in government is oftentimes limited to contract management tasks, such as planning and oversight. One response from government organizations is to create internal innovation labs, organize hackathons, hire Chief Innovation Officers, or try to recruit industry expertise into government, however, it is unclear what success these responses will have on the effectiveness of government IT innovations.

We observe first organizational, structural, managerial, procedural, and technological changes to address the changing internal and external environments of government organizations. As examples, the UK and US

governments have adopted new organizational structures in the form of digital services teams that are able to respond faster to ad hoc needs of their internal government clients (Mergel, 2017). They have adopted an agile government approach designing software in a more information- and user-centric way that is standard in the IT industry. The idea is that once software is developed, it will be shared widely across all levels of government and no longer siloed in one department. In addition to design innovations, governments need to adapt to changes in their internal and external environments and create systems that allow them to scan trends and identify developments, predict their potential impact on the organization, and develop and implement responses (Gong & Janssen, 2012).

While agile methods originate from the software engineering domain, agile government practice extends the focus to a broader spectrum and in this way, it is intended to transform organizational culture and methods of collaboration to achieve higher level of adaptiveness. At the same time, the extensive practice of agile government also requires knowledge and theory to address various challenges and opportunities that governments might face. These challenges include but are not limited to accountability, the potential need for new policy, and information overload, as reported by the articles included in this special issue. Organizations employing agile government approaches would also want to seize the potential benefits and opportunities afforded by making use of social media, big data and emerging forms of new economy such as the sharing economy. It is therefore valuable to discover new applications of agile government approaches and identify the knowledge gaps of current agile government practices in various contexts.

This article provides a brief overview of agile software development, and analyzes and synthesizes the existing literature on agility in

**Table 1**

Principles of agile software development.

Principle 1	Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
Principle 2	Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
Principle 3	Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
Principle 4	Business people and developers must work together daily throughout the project.
Principle 5	Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
Principle 6	The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
Principle 7	Working software is the primary measure of progress.
Principle 8	Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
Principle 9	Continuous attention to technical excellence and good design enhances agility.
Principle 10	Simplicity—the art of maximizing the amount of work not done—is essential.
Principle 11	The best architectures, requirements, and designs emerge from self-organizing teams.
Principle 12	At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Source: <http://agilemanifesto.org/principles.html>

government with the goal to provide a shared definition, identify existing research streams, and provide a series of research questions that emerge out of the review. In the following, we will first review the method we applied to conduct the systematic literature review, the coding approach we have chosen as the basis for our analysis, and provide the synthesis of the current status of agile government.

The article then reviews and summarizes the accepted articles for this special issue on agile government. These articles serve to identify emerging issues, theories, and practices regarding further development of agile government research. In the last section, we will provide a set of open research questions for the government technology community.

## 2. Brief overview of agile software development

This section provides an overview of agile software development as a foundation to the ensuing discussion of agility in government. The review is not exhaustive, but rather selective and intended to describe key principles and concepts.

The notion of agile software development is often traced to the 2001 release of the Agile Software Manifesto (<http://agilemanifesto.org/>), which is founded on twelve principles (see Table 1) that serve primarily as guidelines for agile software development. According to Dingsøyr, et al. (2012:1214), “At its core, agility entails ability to rapidly and flexibly create and respond to change in the business and technical domains.” More broadly, agility refers to the ability of organizations to be nimble and adapt quickly to changing needs and demands, or what Cockburn (2006) describes as a methodology that promotes maneuverability and speed of response.

In their overview article, Dingsøyr et al. (2012:1214) identify several key emergent definitions of agility (see Table 2). Though these definitions provide variations on the notion of agility, they include common themes of efficiency, cost effectiveness, leanness, speed, flexibility, quality, and simplicity.

Although a majority of the literature promotes the positive aspects of adopting agile methods, Fridman (2016) identifies five leading disadvantages of agile methodologies: 1) Less predictability due to the inability to quantify the full level of effort required; 2) More time commitment necessary due to the close communication required across teams involved in the effort; 3) Greater demands on developers and clients (e.g., training, participation); 4) Lack of necessary documentation due to the just in time nature of development; and 5) Potential for projects to get off track due to continually redefined needs.

**Table 2**

Selected definitions of agile software development.

Henderson-Sellers and Serour (2005)	The ability to adapt to different changes and to refine and fine-tune development processes as needed
Lee and Xia (2010)	The ability to efficiently and effectively respond to and incorporate user requirement changes during the project life cycle
Conboy (2009:340)	The readiness “to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment.”

Source: Dingsøyr, et al. (2012, p. 1214).

The above brief overview provides context regarding agile methods and development as derived from the private sector. This special issue focuses on agile methods in government and the extent to which these methods translate – and in what ways – to the public sector. The ensuing section presents the methodology used to identify key factors, approaches, and uses of agile methods by governments.

## 3. Methodology

### 3.1. Search strategy

Agility and adaptiveness are keywords that have become popular in mainstream media, particularly in relation to private sector organizations, but are less well documented in the public sector and information technology literature. In order to understand the way that researchers have studied these concepts in the past, the authors conducted a systematic literature following the PRISMA method (Moher et al., 2009). According to the PRISMA statement (Liberati et al., 2009), the method helps researchers summarize existing evidence according to an explicit, rigorous, and transparent step-wise process. The authors identified the keywords and sources, followed by screening the results for eligibility and deciding which sources to include.

### 3.2. Identification of sources

The review was limited to articles and conference proceedings that were published during the last 30 years (1988–2018). We chose this rather long timespan to increase the inclusion of possible sources. We included Web of Science and Google Scholar as our main databases, and our initial search used the following pre-defined keywords: adapt\* AND government, flex\* AND government, agil\* AND government. This initial search yielded over 100,000 hits.

*Inclusion criteria* focused on substantive criteria (i.e., the references had to be published in the context of public management and information management), publication genre (only books, book chapters, and peer-reviewed articles were deemed as academic texts), and their availability in full-text format. We decided to reduce the number of articles for the review by limiting our search only to the (1) the title of the text, (2) the abstract, and (3) the keywords and keywords plus fields, an algorithm that provides expanded terms stemming from the record's cited references or bibliography. After removing duplicates and articles that did not hold to the criteria listed above, this search led to

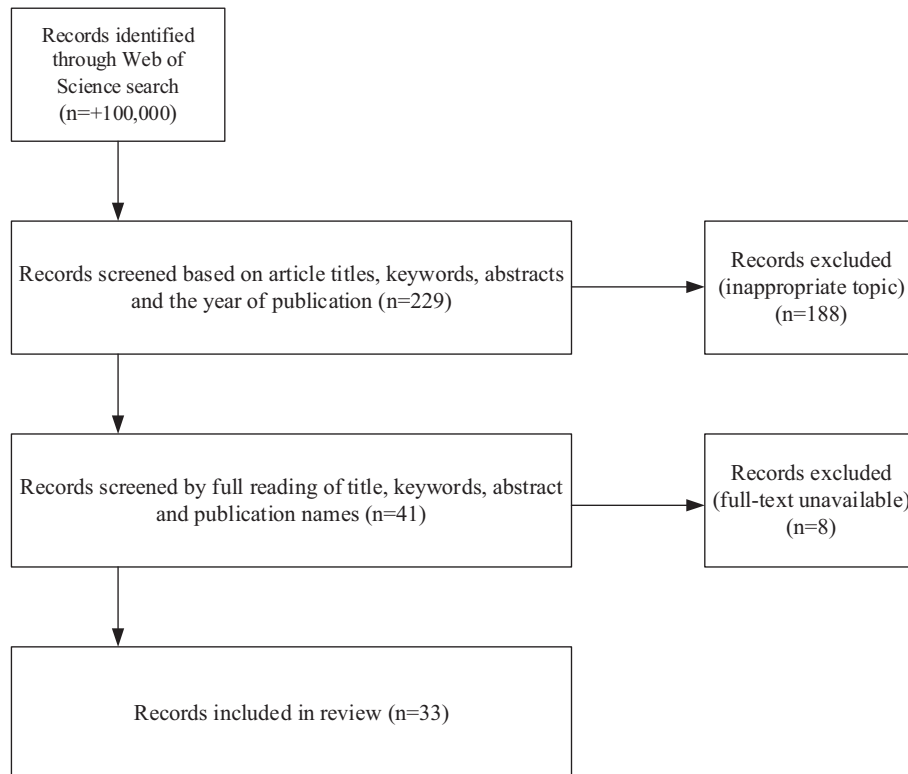


Fig. 1. PRISMA – steps in the systematic literature review.

an initial number of 229 references that served as a starting point for our review. Using both automatic search criteria and review of the article titles and abstracts, we excluded 188 articles that did not fit the inclusion criteria.

In a second step, we removed an additional eight articles that were not available in full text format at either one of the authors' institutions and therefore not suitable for review. The remaining 33 references include: 25 published conference papers, and eight academic journal articles. The references included in the review are listed in [Appendix 1](#). [Fig. 1](#) shows the PRISMA flowchart of our selection and inclusion process after reviewing the references.

As a next step, the authors coded the remaining 33 references for definitions they used, research methods that were applied and the focus of the articles on specific research domains. The results of this coding approach are listed in [Appendix 2](#). Next, we will present the results of our systematic review of the literature.

#### 4. Findings

The systematic literature review identified four different types of domain areas that use the term agile in government settings: agile software development, agile project management, agile acquisition, and agile evaluation. In order to understand each of these areas and their contribution to the literature, we will first review definitions for agility in government.

##### 4.1. Defining agility

A common theme among the articles offering a definition is the focus on outcomes of agility. Agile is used as an adjective referring to the need of organizations – and especially bureaucracies – to become more flexible, adaptive, and rapid in their behavior ([Alsudairy & Vasista, 2014](#)). This refers mostly to their responsiveness to external social, or economic and market threats ([Clark, 2007](#); [Dahmardeh & Pourshahabi, 2011](#)). These external threats or challenges also include

the adoption of new technologies or systems ([Dittrich, Pries-Heje, & Hjort-Madsen, 2005](#)). As a result, organizations are finding new forms of rapidly adapting to the changes in the environment by using agile contracting procedures ([Franklin, 2008](#)) in order to make necessary changes to products and service acquisition that are meeting the changing demands of the customers ([Dittrich et al., 2005](#)). This is done by quickly redesigning in an iterative manner with incremental development steps ([Hamed & Abushama, 2013](#)) and integrating customers into the redesign process ([Lappi & Aaltonen, 2017](#)).

[Mergel \(2016\)](#) provides a comprehensive definition that introduces agile innovation management as a holistic concept that does not refer to an isolated area of agility, such as software development or project management. Instead, it includes project management and software development processes, adjusted procurement procedures, combined with human resources policies, and organizational and managerial approaches to support innovative digital service delivery in government. Most importantly, agility has to be driven by leadership promoting agile approaches in all areas of government.

##### 4.2. Research methods used in agile government studies

The majority of the reviewed agile government studies employed case study as their research method. Other studies employed interview, survey, and even action research method to conduct the research. We also observed that a small number of articles use literature and document review to achieve an understanding of agile government. Based on the proportion of different research methods employed by those studies (see [Appendix 2](#) for details), we found that the existing agile government studies are mainly empirical research and focus on the applications and practice of agile government approaches in various contexts.

##### 4.3. Application areas of agile approaches in government

The analyzed articles focus on four application areas of agility in government: agile software development, agile project management,

agile acquisition, and agile evaluation. We will discuss each in turn.

#### 4.4. Agile software development

The traditional approach to software development in government is the waterfall approach, which includes step-wise programming and testing of larger projects without the possibility to go back to previous phases. This has been proven to be a slow process, as product owners have to wait for the foolproof delivery by the end of the contract period as part of a traditional IT contracting agreement. Agile software development approaches involve creating, testing, and improving technology products incrementally in short, iterative sprints. The goal is to rapidly respond to changes or mistakes discovered in the development process (Rigby, Sutherland, & Takeuchi, 2016). The overall project is broken down into small modules and short sprint cycles. Many of these agile principles have also made it into the agile development manifesto (Beck et al., 2001).

Application areas of agile software development approaches can be seen in 'on-the-fly' service providing (Das, Padhy, Patnaik, & Mohini, 2014), or rapid web redesign to adapt to changes in the business environment of the organization (Izumi & Hasida, 2008). However, research has also shown that agile methods alone might not be sufficient. Bellomo, Nord, and Ozkaya (2013) show that a combination of different practices is necessary to quickly respond to unanticipated stability problems. In addition, Karouw and Wowor (2016) suggest the inclusion of prototyping, interviewing, focus group discussions, and user stories as effective tools to increase stakeholder commitment. In a similar vein, Berger and Pacis (2005) explain that introducing agile approaches in itself does not necessarily lead to the expected outcomes in rigid, hierarchical command-and-control organizations. Instead, leadership needs to demonstrate how cultural change can be initiated by allowing people to understand why they need to change from individual practices to collaborative work practices (Moore, 2002; Morgan, 2009). The example of *Forge.mil* by Martin and Lippold (2011) shows how agile approaches can overcome stakeholder concerns. Similarly, Upender (2005) and Lorber and Mish (2013) found that scrum and other agile practices need to be adapted to the specific work environment to fit them into preexisting dominant logics of the organization.

Overall, the use of agile methods has made organizations internally more collaborative (Berger & Pacis, 2005), communicative (Upender, 2005), and faster by increasing the number of releases (Russo, 2016). Facing external stakeholders, agile approaches contribute to increasing the loyalty of users and satisfaction because of higher quality of software products (Hamed & Abushama, 2013). Further, organizations can respond faster to the changing requirements in their environment.

#### 4.5. Agile acquisition

The second research stream highlights the need to integrate agile development approaches with new forms of acquisition and vendor management. Especially in government environments with limited budgetary resources, the social legitimacy and efficient use of limited resources is seen as an important argument to change acquisition and contracting practices (Alsudairy & Vasista, 2014). This includes new forms of contracting approaches: vendors have to show upfront that they are able to produce a prototype, instead of waiting until the end of the contract period to present their final product (Mergel, 2016). However, changing the DNA of how government purchases software products has proven difficult, especially when traditional vendors or IT service organizations representing large groups of vendors negate agile acquisition efforts and aim to deliver in the traditional formats (Clark, 2007; Mergel, 2017). As Franklin (2008) shows, agile contracting is especially successful under contracts with fixed constraints of scope, schedule and cost. It will help organizations increase scope flexibility, which might be especially challenging for the government sector where well-established waterfall development and fixed scopes are still the

dominant approach of software acquisition (Alleman, Henderson, & Seggelke, 2003).

Overall, agile contracting and acquisition practices help governments avoid vendor lock-in, and move away from proprietary applications and single-vendor contracts. Doing so enables governments to focus on government's internal capacities, while at the same time address critiques concerning industry specialization and efficiency that can be provided by the private sector (Mergel, 2017).

#### 4.6. Agile project management

The third research stream focuses on the application of agile methods in all aspects of project management – not just software projects, with the goal to improve government's ability to streamline project and increase flexibility in delivery. However, research finds that especially government bureaucracies have reduced motivation to accept new project management approaches that are not aligned with its command-and-control structure (Altukhova, Vasileva, & Slavin, 2016). In turn, current project governance practices can have a significant impact on agile software development projects, as Lappi and Aaltonen (2017) show. They suggest applying six dimensions of project management governance to agile projects: business case, contracting, controlling, steering, decision-making, and capability building. Similarly, Strojny (2016) suggests that government organizations need to accept a project orientation in public administrations that includes planning, controlling, and task-budgeting on both the strategic and operational levels.

Dittrich et al. (2005) review how agile project management approaches can be used to prepare a government organization for upcoming major organizational changes. They found that organizational change needs to be integrated and aligned with IT change and early on aligned with the overall IT vision. In this process, the existing approaches of IT public service delivery need to be reviewed and new tools and techniques need to be applied.

Both Mergel (2016) and Scott, Johnson, and McCullough (2008) consider even more holistic approaches to agile innovation management and put the leadership aspects in the center of organizational change projects in government. Scott et al. show that at the City of Calgary the management team demonstrated support, encouragement and openness to change as a prerequisite for organizational change. Mergel (2016) found that a change in the mindset on the management level toward agile leadership is necessary to move government organizations toward agile approaches. They were both providing incentives and motivation to shift toward new tools and techniques, as well as served as a punching ball and provided air cover vis-à-vis leadership to protect their agile teams against criticism.

Holistic agile project management approaches have proven especially valuable in disaster situations, where rapid, on the fly responses are necessary (Carpenter & Grunewald, 2016).

#### 4.7. Agile evaluation

The fourth application area, and largely underexplored in the government context, is the evaluation of agile approaches. In our systematic literature review only two references highlighted the need for evaluation. Dahmardeh and Pourshahabi (2011) explore ways to measure and assess public sector agility – using approaches from private sector experiences. The absolute agility index is combined with fuzzy logic to address the ambiguity in agility evaluation in the public sector. They suggest five solutions for increasing agility levels in the public sector: provide a clear vision for the whole organization; provide useful information about the approach online; provide e-consultation possibilities for customers; provide instruction for employees on the future of work; and implement new technologies for service provision. Campbell, Wampole, and Wheeler (2015) outline an approach using dynamic and executable model-based engineering (MBE) to implement agile



capability in government. The technical baseline is measured against the costs of the implementation and architectural missteps are reversed to avoid impacts on budget and schedule. As a result, costs and risks are reduced through early validation and the evaluation of alternatives.

#### 4.8. *The future of agile government and adaptive governance*

The preceding review of the literature demonstrates that agile government is a developing area of research and practice. In part, the review shows that there are both gains and challenges in applying agile techniques in the public sector. On the one hand, governments and the citizens whom they serve benefit from greater efficiencies, better designed and implemented applications, and cost savings. On the other hand, agile deployments require capacity, skills, culture, policy structures, and leadership that governments may not possess. This special issue seeks to explore the current and future state of agile government.

Hong and Lee's (2018) article provides evidence of how regulation and decentralization impacts adaptive governance. The authors argue that decentralization of governance can hinder the process of adaptation in the sharing economy, especially if the considered policy embodies entrepreneurial politics. Using the example of two different types of policies and their impact on the sharing economy, especially AirBnB, they show that central or federal governments are relatively more favorable to sharing services than local or city governments. Their article provides insights into the need for adaptive policy making in order to respond to changing external pressures from the environment.

Wang, Medaglia, and Zheng's (2018) article investigates adaptive governance in the context of digital government where new forms of collaborative governance are needed to rapidly adapt to changes in the internal and external environments. They assert that an adaptive governance requires refinement and empirical testing. They show in four IT-related project collaborations that the degree of sharing of decision-making power and of accountability between government and non-government actors is critical for developing different types of adaptive governance. They distinguish three types of adaptive governance – namely polycentric, agile, and organic governance. Their contribution adds to the developing research stream of agile project management.

In their paper, Soe and Drechsler (2018) discuss how local governments collaborate for joint service provision, be more adaptive toward new technological and organizational changes, and introduce innovative services following industry trends such as predictive analytics, autonomous vehicles, and artificial intelligence. The paper adopts the Public Value (PV) framework, a derivative from New Public Management, for the organization and management of government performance. Based on the PV concept, the article introduces an 'adaptive model' for local governments through which each procured ICT solution is preceded by agile, open, bottom-up and experimental trial. The model is corroborated via a case study methodology that studied the cities of Helsinki and Tallinn, in particular a joint, collaborative, innovation-lab-type structure that enabled the conduct agile trials in the field of smart mobility before traditional procurement. Their article addresses cross-cutting themes in agile acquisition, agile project management and development.

Chatfield and Reddick (2018) show how a U.S. city government's use of big data analytics enhances customer agility in 311 on-demand services. They found innovative localized big data analytics use, but did not discover any evidence of city-wide systemic change in the operation and delivery of Houston 311 on-demand services. They found that process-level strategic alignment, digital infrastructures, and assimilation of big data technologies impact customer agility. Based on their findings, the authors developed and tested a theoretical framework of observed customer agility using insights from interviews with executives and operational managers. Overall, the authors argue that big data analytics need to be embedded into critical processes to create greater public value in the 311 on-demand citizen services environment. Their case study indicates the importance of a culture of analytics driven by

strong political leadership in the data-driven government for greater city-wide public value creation. This article adds to our understanding of how new technologies and especially data analytical processes can make government response to citizen demands more agile.

#### 5. Discussion and open research questions

As with any emerging area of study and practice, there are a number of research questions that require exploration. These include, for example, the conditions under which government organization can become more agile: What are the pre-requisites for governments to engage in agile efforts, e.g., skills, capacity, policies, leadership? And relatedly, what does it mean for a government to be 'agile ready'? In addition, what are the critical success factors that need to be in place for governments to adopt agile approaches?

An open question is the extent to which agile approaches can work within traditional command-and-control structures of government. Bureaucracies in general are not designed for shared leadership or open collaboration approaches across ad hoc teams. It is unclear how a bureaucracy, often intentionally designed to move slowly and methodically, can become more agile – or what governments may need to do to move their organizational structures, management approaches, budget allocation methods, communication structures, reward incentives, and other factors to adopt and implement agile methods. More research is needed to understand how bureaucracies can adapt or how agile approaches can be aligned with the needs of bureaucracies and their regulations.

Agile approaches require new forms of procuring, designing, and implementing IT-enabled services and resources. Further, the initial research points to the need to create different forms of organizational leadership and structures. In addition, there are indications that cross-organizational (inter-agency) and jurisdictional (local, regional, national) collaborations can yield even greater efficiencies. Governments, however, reside within legal and regulatory environments that can serve as barriers to the creation of efficiencies, economies of scale, information sharing, and interoperable technology development and implementation. Thus more research is necessary to better understand the legal and regulatory environment required to foster and promote agile efforts.

The literature is especially sparse when it comes to the evaluation of agile approaches. This reflects the need for more knowledge and theory about the changes that occur in the organization when agile approaches are introduced. What metrics are appropriate for measuring and evaluating agile efforts? More specifically, how does government determine success? More research is needed to understand how to measure and evaluate agility and its impact on government organizations. As an example, agile government approaches have an impact on how government services are designed, acquired, and delivered. Combining agile approaches with existing business process management might help governments design online services that are used in similar fashions like other online transactions, such as online sales on sites like Amazon or social media sites.

In addition, there is a need to better understand how government structures and characteristics – centralized, size, engagement with public-private partnerships, innovation efforts, technology maturity, and others – impact the ability of governments to engage in agile methods. It may be that differing conditions within governments can influence the success and extent of agility within government settings.

These identified questions and research are not intended to be comprehensive, but rather to suggest future areas of research as governments continue to explore the use and adoption of agile techniques. More empirical research is needed to gain a deeper understanding about agile approaches and their impact on government and its stakeholders. Overall, however, we conclude that agile government needs to become a holistic approach that focuses on flexibility of regulations, adaptation to a functioning bureaucracy, and project- as well as process-level alignment.

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## Appendix 1. Analyzed articles

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- | #  | Article reference   |
|----|---|
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## Appendix 2. Synthesis of articles included in the systematic literature review

Category	Codes	Articles
Research methods	Case study	(Alleman et al., 2003), (Das et al., 2014), (Franklin, 2008), (Izumi & Hasida, 2008), (Lappi & Aaltonen, 2017), (Bellomo et al., 2013), (Berger & Pacis, 2005), (Bishop & Savoury, 2004), (Campbell et al., 2015), (Al-Haidari, Salah, Sqalli, & Buhari, 2017; Dahmardeh & Pourshahabi, 2011), (Dittrich et al., 2005), (Upender, 2005), (Strojny, 2016), (Scott et al., 2008), (Rindengan & Tulenan, 2015), (Karouw & Wowor, 2013), (Lorber & Mish, 2013), (Martin & Lippold, 2011), (Morgan, 2009), (Moore, 2002), (Kaneda, 2006), (Gump, Mazzuchi, & Sarkani, 2017), (Alleman et al., 2003), (Alsudairy & Vasista, 2014), (Rindell, Hyrynsalmi, & Leppanen, 2016)
	Interviews	(Carpenter & Grunewald, 2016), (Mergel, 2016), (Karouw & Wowor, 2016), (Pinheiro, Maurer, & Sillito, 2008)
Focus	Literature and document review	(Carpenter & Grunewald, 2016), (Mostashari, McComb, Kennedy, Cloutier, & Korfiatis, 2012), (Russo, 2016), (Hamed & Abushama, 2013), (Gump et al., 2017), (Clark, 2007)
	Surveys	(Altukhova et al., 2016)
	Action research	(de Sousa, Venson, Figueiredo, Kosloski, & Ribeiro, 2016)
	Agile project management	(Altukhova et al., 2016), (Carpenter & Grunewald, 2016), (Dittrich et al., 2005), (Lappi & Aaltonen, 2017), (Scott et al., 2008), (Strojny, 2016), (Mergel, 2016)
	Agile software development	(Das et al., 2014), (de Sousa et al., 2016), (Izumi & Hasida, 2008), (Bellomo et al., 2013), (Upender, 2005), (Berger & Pacis, 2005), (Russo, 2016), (Rindengan & Tulenan, 2015), (Karouw & Wowor, 2013), (Lorber & Mish, 2013), (Karouw & Wowor, 2016), (Kaneda, 2006), (Hamed & Abushama, 2013), (Gump et al., 2017), (Alleman et al., 2003), (Rindell et al., 2016), (Martin & Lippold, 2011), (Mostashari et al., 2012), (Morgan, 2009), (Moore, 2002), (Pinheiro et al., 2008)
	Agile acquisition	(Alleman et al., 2003), (Bishop & Savoury, 2004), (Franklin, 2008), (Mergel, 2016), (Clark, 2007), (Alsudairy & Vasista, 2014)
	Agile evaluation	(Campbell et al., 2015), (Dahmardeh & Pourshahabi, 2011)

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